

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
25 August 2005 (25.08.2005)

PCT

(10) International Publication Number
WO 2005/078801 A1

(51) International Patent Classification⁷: **H01L 27/146**,
G01J 3/46

Floravale, Westwood Avenue, #012-41, Singapore 648363 (SG).

(21) International Application Number:
PCT/SG2005/000043

(74) Agent: **ALBAN TAY MAHTANI & DE SILVA**; 39 Robinson Road, #07-01 Robinson Point, Singapore 069811 (SG).

(22) International Filing Date: 17 February 2005 (17.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/544,496 17 February 2004 (17.02.2004) US

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(71) Applicant (*for all designated States except US*):
NANYANG TECHNOLOGICAL UNIVERSITY
[SG/SG]; 50 Nanyang Avenue, Singapore 639798 (SG).

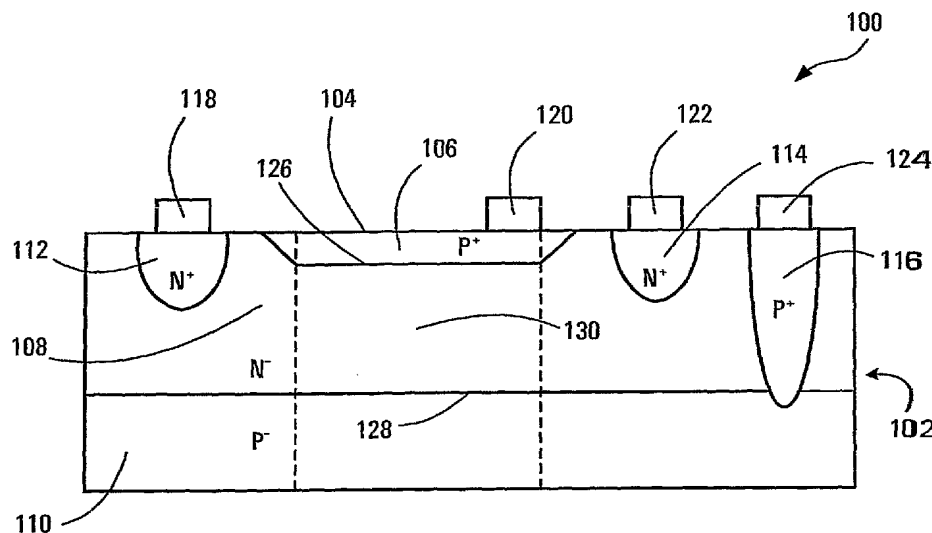
(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **POENAR, Daniel Puiu** [RO/SG]; 98 Nanyang Crescent, #06-03, Singapore 637665 (SG). **CARP, Mihaela** [RO/SG]; Blk 238 The

[Continued on next page]

(54) Title: METHOD AND DEVICE FOR WAVELENGTH-SENSITIVE PHOTO-SENSING



(57) Abstract: A semiconductor device includes a conducting channel (130) formed beneath a substrate surface with a pre-determined photo-conductivity spectral response. The channel is formed between two pn-junctions (126, 128) defining first and third photo-electric depletion regions at respective depths relative to the surface corresponding to penetration depths of light of different wavelengths. The first region (106) which has the light absorbing surface (104) above the first pn-junction (126) is specific to a first colour. The channel region (130) between the two pn-junctions (126, 128) is photo-conductive to a second colour. The third region below the second pn-junction (128) is sensitive to a third colour. Electrical contacts (118, 120, 122, 124) are disposed on the source (112), the top gate (106), the drain (114) and the bottom gate (116) for receiving the electrical currents induced by the presence of the absorbed wavelengths.



SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.